

# PATENT COOPERATION TREATY

## PCT

### INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

REC'D 08 MAR 2006

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Applicant's or agent's file reference GML3173	<b>FOR FURTHER ACTION</b> See Form PCT/IPEA/416	
International application No. PCT/GB2004/005216	International filing date (day/month/year) 14.12.2004	Priority date (day/month/year) 17.12.2003
International Patent Classification (IPC) or national classification and IPC F16F7/10		
Applicant UNIVERSITY OF SOUTHAMPTON et al.		
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 5 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input type="checkbox"/> <i>sent to the applicant and to the International Bureau</i> a total of sheets, as follows:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</li> <li><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</li> </ul> <p>b. <input type="checkbox"/> <i>(sent to the International Bureau only)</i> a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>		
<p>4. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> Box No. I Basis of the opinion</li> <li><input type="checkbox"/> Box No. II Priority</li> <li><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</li> <li><input type="checkbox"/> Box No. IV Lack of unity of invention</li> <li><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</li> <li><input type="checkbox"/> Box No. VI Certain documents cited</li> <li><input type="checkbox"/> Box No. VII Certain defects in the international application</li> <li><input type="checkbox"/> Box No. VIII Certain observations on the international application</li> </ul>		
Date of submission of the demand  22.06.2005	Date of completion of this report  07.03.2006	
Name and mailing address of the international preliminary examining authority:   European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer  Prussen, J  Telephone No. +49 89 2399-2047	



# INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.  
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## Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
  - This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
    - international search (under Rules 12.3 and 23.1(b))
    - publication of the international application (under Rule 12.4)
    - international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements\*** of the international application, this report is based on (*replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*):

### Description, Pages

1-27 as originally filed

### Claims, Numbers

1-14 as originally filed

### Drawings, Sheets

1/17-17/17 as originally filed

a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

- The amendments have resulted in the cancellation of:
  - the description, pages
  - the claims, Nos.
  - the drawings, sheets/figs
  - the sequence listing (*specify*):
  - any table(s) related to sequence listing (*specify*):
- This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
  - the description, pages
  - the claims, Nos.
  - the drawings, sheets/figs
  - the sequence listing (*specify*):
  - any table(s) related to sequence listing (*specify*):

\* If item 4 applies, some or all of these sheets may be marked "superseded."

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**Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

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**1. Statement**

Novelty (N)	Yes:	Claims	1-14
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-14
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-14
	No:	Claims	

**2. Citations and explanations (Rule 70.7):**

**see separate sheet**

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**Re Item V**

**Reasoned statement with regard to novelty, inventive step or industrial applicability;  
citations and explanations supporting such statement**

Reference is made to the following document:

D1: US-A-5 884 736 (BURDISSO ET AL) 23 March 1999 (1999-03-23)  
D2: US-A-4 483 425 (NEWMAN ET AL) 20 November 1984 (1984-11-20)

1. The document D1 is regarded as being the closest prior art to the subject-matter of claim 1 and shows (the references in parentheses applying to this document, see also fig. 1) an inertial actuator assembly.

The subject-matter of claim 1 differs from this known actuator in that the inertial actuator comprises an actuator chassis adapted to be secured in use to a structure subject in use to external vibration forces, a proof mass ( $m_a$ ) supported with respect to the chassis by a proof mass resilient means, and a force generating transducer means acting between the chassis and the proof mass for subjecting in use the proof mass to a force ( $f_a$ ) applied relative to the chassis, a controller arranged to control in use the excitation of the transducer means, and a feedback means  $H(j\omega)$  responsive to a measurement of the displacement ( $x$ ) of the proof mass relative to the chassis, the controller being arranged to modify the excitation of the force generating transducer means in response to a feedback signal from the feedback means.

2. The subject-matter of claim 1 is therefore new (Article 33(2) PCT). The problem to be solved by the present invention may be regarded as providing an inertial actuator with an improved low frequencies response.

3. The solution to this problem proposed in claim 1 of the present application is considered as involving an inventive step (Article 33(3) PCT) for the following reasons:

By using a displacement feed-back control as defined in claim 1 the actual displacement of the proof mass is measured, contrary to the teaching of the prior art

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documents where the displacement of the structure supporting the inertial actuator is measured. Thus the inertial actuator can function effectively over a wider range of frequencies.

Concerning documents D1 and D2, the skilled man even when combining the teaching of both documents would not arrive at an inertial actuator as defined in claim 1 of the present application, as there is no hint to use a controller together with a feed-back means responsive to a measurement of the displacement of the proof mass relative to the chassis of the actuator, thus allowing also a completely self-contained actuator.

4. Claims 2 to 14 are dependent on claim 1 and as such also meet the requirements of the PCT with respect to novelty and inventive step.